CLAIMS

I claim:

1. A trolling motor controller for controlling a trolling motor and directing the trolling motor in a target direction, the trolling motor controller comprising:

a transmitting means for transmitting signals, wherein the signals contain information corresponding to a target direction for the trolling motor controller to achieve, the target direction being automatically sensed by a direction sensor; and,

a receiving means for receiving the signals wherein the receiving means is further operative to cause a change in the steering direction of the trolling motor to achieve the target direction.

2. The controller of claim 1, wherein the transmitting means further comprises a direction sensor for automatically sensing the target direction.

3. The controller of claim 2, wherein the direction sensor comprises an electronic magnetic compass.

4. The controller of claim 2, wherein the direction sensor comprises a light source.

5. The controller of claim 2, wherein the direction sensor comprises a radio wave phase direction detector.

6. The controller of claim 1, wherein the transmitting means further comprises a direction set switch for indicating to the receiving means the desire to achieve the target direction when the direction set switch it toggled.

7. The controller of claim 6, wherein achieving the target direction is performed by a single action by an operator.

8. The controller of claim 6, wherein the direction set switch is adapted to be affixable to a member wherein the member allows an operator of the transmitting means to simultaneously

affect toggling of the set switch and perform a plurality of operations requiring the operator's hands.

9. The controller of claim 1 further comprising:

a second transmitting means having a direction set switch for indicating to the receiving means the desire to achieve the target direction when the direction set switch is toggled.

10. The controller of claim 1 further comprising:

a second transmitting means having a direction set switch for indicating to the first transmitting means the desire to achieve the target direction when the direction set switch is toggled, the first transmitting means indicating to the receiving means the desire to achieve the target direction when the direction set switch is toggled.

11. A method for controlling a trolling motor and directing the trolling motor in a target direction, wherein the trolling motor is associated with a trolling motor controller, and wherein the trolling motor controller comprises a transmitting means and a receiving means, the method comprising the steps of:

affecting the sensing of the target direction using the transmitting means; and,

affecting a change in the trolling motor using the sensed target direction to achieve the target direction..

12. The method of claim 11 wherein the sensing is performed by a direction sensor.

13. The method of claim 11 wherein a direction sensor indicates the target direction to be achieved.

14. The method of claim 11 further comprising the step of affixing the transmitting means to a member.

15. The method of claim 11 further comprising the step of toggling a direction set switch for indicating to the receiving means the desire to achieve the target direction.

16. The method of claim 11 further comprising the step of operating the transmitting means by a single action by an operator.

17. The method of claim 11 further comprising the step of affixing the transmitting means to a fishing pole.

18. The method of claim 11 further comprising the step of affixing the transmitting means to a hat.

19. The method of claim 11 further comprising the step of affixing the transmitting means to a pair of glasses.

20. The method of claim 15 wherein the direction switch is affixable to a member for allowing an operator of the transmitting means to simultaneously toggle the direction set switch and perform a plurality of operations requiring the operator's hands.

21. The method of claim 15 further comprising the step of toggling the direction set switch for producing a signal

22. The method of claim 11 further comprising the step of the receiving means receiving a signal from the transmitting means.

23. The method of claim 11 further comprising the step of the receiving means producing a signal.

24. The method of claim 11 further comprising the step of the receiving means affecting a change in the trolling motor.

25. A trolling motor control system for controlling a trolling motor and directing the trolling motor in a target direction, the trolling motor system comprising:

a direction sensor for sensing the target direction,

a signal comprising information corresponding to the target direction for the trolling motor controller to achieve, wherein the signal is used to cause a change in the steering direction of the trolling motor to achieve the target direction.

26. The trolling motor control system of claim 25, further comprising:

a transmitter for transmitting the signal; and,

a receiver for receiving the signal.

27. The trolling motor control system of claim 25, wherein the direction sensor comprises a three-axis tilt compensated compass.

28. The trolling motor control system of claim 26, wherein the three-axis tilt compensated compass comprises at least one of a fluid tilt sensor and an electronic tilt sensor.

29. The trolling motor control system of claim 26, wherein the receiver is connected to a circuit capable of determining the target direction from the signal.

30. The trolling motor control system of claim 26, wherein the transmitter is operably connected to a direction set switch for indicating when to acquire the target direction.

31. The trolling motor control system of claim 30, wherein the direction set switch is adapted to be affixable to a member, wherein the member allows an operator of the transmitter to simultaneously affect toggling of the direction set switch and perform a plurality of operations requiring the operator's hands.

32. The trolling motor control system of claim 26 further comprising:

a direction set switch, remotely located from the transmitter, for transmitting signals to the receiver to acquire the target direction when the direction set switch is toggled.

33. The trolling motor control system of claim 26, further comprising:

a second receiver, operatively connected to the transmitter, for receiving a request for the target direction; and,

a second transmitter, operatively connected to the receiver, for transmitting signals requesting the target direction.

34. A method for controlling a trolling motor and directing the trolling motor in a target direction, wherein the trolling motor is operatively connected to a trolling motor controller, and

wherein the trolling motor controller comprises a transmitter, the method comprising the steps of:

affecting the sensing of the target direction using the transmitter; and,

affecting a change in the trolling motor using the sensed target direction to achieve the target direction.

35. The method of claim 34 further comprising the step of toggling a direction set switch for indicating that the target direction should be acquired.

36. The method of claim 34, wherein the step of affecting a change in the trolling motor direction is performed by a single action by an operator.

37. The method of claim 35, wherein the direction set switch is affixable to a member for allowing an operator of the transmitter to simultaneously toggle the direction set switch and perform a plurality of operations requiring the operator's hands.

38. The method of claim 34 further comprising the step of receiving a signal from the transmitter.

39. The method of claim 34, wherein the sensing compensates for the tilt of the direction sensor.

40. A trolling motor control system for controlling a trolling motor and directing the trolling motor in a target direction, the trolling motor system comprising:

a direction sensor for sensing the target direction;

a digital compass; and

a tilt compensator operatively connected to the digital compass for compensating for the orientation of the digital compass.

41. The trolling motor control system of claim 40, wherein the tilt compensator comprises an electronic circuit.

42. The trolling motor control system of claim 40, wherein the tilt compensator comprises a microprocessor.

43. The trolling motor control system of claim 40, wherein the tilt compensator comprises at least one of an electronic tilt sensor, a solid state magnetic sensor, and a fluid sensor.

44. The trolling motor control system of claim 40, wherein the digital compass comprises an electronic magnetic compass.

45. A motor control system for a trolling motor, comprising:

a heading detector indicating a heading, and comprising a tilt compensator operatively connected to a digital compass, wherein the tilt compensator adjusts an output from the digital compass to account for a roll angle and a pitch angle of the digital compass, a feedback analyzer operatively connected to the heading detector, wherein the heading detector provides a feedback signal to the feedback analyzer;

a propulsion device coupled to the heading detector;

a controller operatively connected to the feedback analyzer and to the propulsion device for controlling the heading, wherein the feedback analyzer achieves a heading substantially identical to a target heading, wherein the feedback analyzer provides a control signal to the controller.

46. The motor control system of claim 45, further comprising:

an input device operatively connected to the feedback analyzer, for receiving the target heading, wherein the input device transmits the target heading as a target heading signal.

47. The motor control system of claim 46, wherein the input device comprises a second heading detector.

48. The motor control system of claim 47, wherein the second heading detector comprises a second tilt compensator operatively connected to a second digital compass for adjusting an

output from the second digital compass to account for a second roll angle and a second pitch angle of the second digital compass.

49. The motor control system of claim 48, wherein the input device comprises a toggle switch and the second heading detector for acquiring the target heading.

50. The motor control system of claim 48, wherein the second heading detector is mounted on at least one of a hat, a fishing pole and a pair of glasses.

51. The motor control system of claim 46, wherein the input device comprises a foot pedal having a variable angular position, the angular position being selectable, and the target heading signal being responsive to the angular position.

52. The trolling motor control system of claim 51, wherein the target heading signal is indicative of the angular position.

53. The motor control system of claim 46, wherein the input device comprises a hand lever.

54. A motor control system for a trolling motor, comprising:

a propulsion device coupled to a boat;

a steering actuator operatively coupled to the propulsion device, wherein the steering actuator is configured to control the orientation of the propulsion device in response to a steering control signal;

an input device for generating a waypoint signal, wherein the waypoint signal is representative of the position of an at least one waypoint;

a position detector for generating a position signal representative of the actual position of the boat;

a heading detector comprising a tilt compensator and a digital compass for generating a heading signal related to the actual heading of the boat, wherein the tilt compensator adjusts the output of the digital compass to account for a roll angle and a pitch angle of the digital compass; and

a control circuit operatively connected to the input device, the position detector, the steering actuator and the heading detector, the control circuit being configured to determine the position of the at least one waypoint based upon the waypoint signal generated by the input device and to determine the actual position of the boat based upon the position signal generated by the position detector, the control circuit being further configured to determine a desired heading based upon the at least one waypoint and the actual position of the boat, and to generate the steering control signal to steer the boat toward the desired waypoint based upon the desired heading and the heading signal, wherein the control circuit steers the boat toward the at least one waypoint.

55. The motor control system of claim 54, wherein the control circuit is further configured to determine the at least one waypoint based upon the actual position of the boat when the input device is manipulated.

56. The motor control system of claim 55, wherein the input device comprises a switch.

57. The motor control system of claim 55, wherein the waypoint signal is representative of the longitude and latitude of the at least one waypoint.

58. The motor control system of claim 54, wherein the control circuit comprises a memory for storing the at least one waypoint.

59. The motor control system of claim 54, wherein the position detector receives a second position signal from at least one transmitting device.

60. The motor control system of claim 59, wherein the transmitting device comprises at least two satellites.

61. The motor control system of claim 60, wherein the position detector comprises a global position system receiver.

62. The motor control system of claim 61, wherein the position detector comprises a differential global position system receiver.

63. The motor control system of claim 54, wherein the steering actuator comprises a steering motor.

64. The motor control system of claim 54, wherein the heading signal is related to the direction of thrust produced by the propulsion device.

65. The motor control system of claim 54, wherein the heading signal is related to the orientation of the boat.

66. The motor control system of claim 54, wherein the heading detector comprises a circuit for determining the actual heading of the boat based upon a change in the actual position.

67. The motor control system of claim 54, wherein the magnitude of the thrust produced by the propulsion device is variable in response to a thrust control signal, and the control circuit is operatively connected to the propulsion device and is further configured to generate the thrust control signal.

68. The motor control system of claim 54, further comprising:

a housing operatively connected to the propulsion device, wherein the position detector, the steering actuator and the control circuit are located within the housing.

69. The trolling motor control system of claim 69, wherein the input device is mounted on a surface of the housing.

70. The motor control system of claim 54, further comprising:

a housing operatively connected to the propulsion device wherein the position detector is external to the housing.

71. The motor control system of claim 54, wherein the control circuit is configured to steer the boat in a predetermined pattern between a plurality of the at least one waypoints.

72. The motor control system of claim 54, wherein the control circuit is configured to steer the boat in a predetermined pattern when the boat arrives at the at least one waypoint.

73. The motor control system of claim 54, wherein, when the boat deviates from a desired course between a plurality of the at least one waypoints, the control circuit is configured to steer the boat substantially back to the desired course before resuming steering to the next waypoint.

74. The motor control system of claim 54, further comprising:

a mode select device operatively connected to the control circuit, wherein the control circuit is further configured to generate a steering control signal to steer the boat along a navigation route and to repeat the navigation of the boat around the navigation route in at least one mode of operation based upon a signal from the mode select device.

75. The motor control system of claim 74, wherein, in one mode of operation, the control circuit generates the steering control signal to steer the boat in reverse order along the navigation route after the boat arrives at an end of the navigation route, whereby the navigation route is repeated in reverse order.

76. The motor control system of claim 74, wherein, in one mode of operation, the control circuit generates the steering control signal to steer the boat in a continuous loop around the navigation route, whereby the navigation route is repeated in the same order.

77. The motor control system of claim 58, further comprising:

an automatic waypoint storage switch operatively connected to the control circuit, wherein the control circuit is further configured to store the at least one waypoint in the memory without operator intervention when the automatic waypoint storage switch is enabled, and to generate a steering signal to steer the boat along a navigation route.

78. The motor control system of claim 77, wherein the memory stores waypoints when a turn is detected when the automatic waypoint storage switch is enabled.

79. The motor control system of claim 77, wherein the memory stores a plurality of the at least one waypoints when the automatic waypoint storage switch is enabled.

80. The motor control system of claim 77, wherein the memory stores a plurality of the at least one waypoints at variable time intervals when the automatic waypoint storage switch is enabled, wherein the time intervals depend on the rate of change in the heading signal.

81. The motor control system of claim 77, wherein the memory stores waypoints at predetermined distance intervals when the automatic waypoint storage switch is enabled.

82. A motor control system for a trolling motor, comprising:

a propulsion device operatively connected to a boat, wherein the propulsion device produces a variable magnitude of thrust to propel the boat in response to a thrust control signal;

an input device for allowing an operator to provide a desired waypoint, wherein the desired waypoint is representative of a location the operator desires to travel to;

a position detector for generating a position signal representative of the actual position of the boat;

a steering actuator operatively connected to the propulsion device, wherein the steering actuator is configured to control the orientation of the propulsion device in response to a steering control signal;

a heading detector operatively connected to a tilt compensator and a digital compass for generating a heading signal related to the actual heading of the boat, wherein the tilt compensator adjusts the output of the digital compass to account for a roll angle and a pitch angle of the digital compass; and

a control circuit operatively connected to the position detector, the propulsion device, the steering actuator, the heading detector, and the input device, the control circuit being configured to determine the actual position of the boat based upon the position signal generated by the position detector and to determine a desired heading based upon the desired waypoint and the actual position of the boat, the control circuit being further configured to generate a thrust control signal and the steering control signal to navigate the boat to the desired waypoint, wherein the

control circuit generates the thrust control signal based at least upon signals generated by the input device.

83. The motor control system of claim 82, wherein the control circuit generates the steering control signal and the thrust control signals to maintain the boat substantially near the desired waypoint when the boat arrives substantially at the desired waypoint.

84 The motor control system of claim 82, wherein the input device generates signals representative of a desired magnitude of thrust.

85. The motor control system of claim 82, wherein the input device generates signals representative of a desired speed of the boat, and the control circuit generates the thrust control signal based upon the desired speed and an actual speed of the boat.

86. The motor control system of claim 85, wherein the actual speed of the boat is an absolute speed based upon a derivative of at least two successive position signals.

87. The motor control system of claim 85, further comprising:

a sensor operatively connected to the control circuit for sensing the speed of the boat relative to a body of water, wherein the actual speed of the boat is the speed relative to the body of water.

88. The motor control system of claim 82, wherein the control circuit modifies the thrust control signal based upon a predetermined relationship between the actual position of the boat and the desired waypoint.

89. The motor control system of claim 82, wherein the control circuit modifies the thrust control signal to gradually decrease the speed of the boat as the fishing boat nears the desired waypoint.

90. The motor control system of claim 82, wherein the control circuit modifies the thrust control signal based upon the rate at which the boat is turning.

91. The motor control system of claim 82, wherein the control circuit generates the thrust control signal to turn off the propulsion device when the fishing boat arrives substantially at the desired waypoint.